

5 SYSTEM AND METHOD FOR PROCESSING A PROGRAM ALREADY IN
PROGRESS

FIELD OF THE INVENTION

The subject invention concerns a method and an apparatus for
10 scheduling the selection of a program, for example, a television program
for watching or recording when the selected television program is already
in progress.

BACKGROUND OF THE INVENTION

15 The programming of modern television systems, such as TV
schedulers, VCRs, and Satellite Receivers has become more complicated
in that the number of available channels has increased dramatically of
late. For example RCA® DSS® direct broadcast satellite receivers provide
as many as 200 channels to choose from. Heretofore, a user who
20 wanted to record a specific non-regularly scheduled television program
such as the airing of a particular movie, would regularly consult a
television schedule printed in his local newspaper in the hope that he
would eventually find that movie listed.

Such a practice may work well when there are only a few television
25 channel schedules to examine, however, it is unlikely that a viewer would
be able to examine the complete schedules for 150 television channels
each week. Such a task would be daunting even if all of the movies were

5 to be listed separately, as some television program listings do. Consequently, it is felt that as the number of channels increases, the chances of successfully locating a single occurrence of a program (like a needle in a haystack) becomes more and more unlikely.

For recording of a selected program, there is a feature commonly
10 known as "one touch recording." With this feature, a user may select a program from for example, a channel guide, and the device housing the channel guide will then send the necessary IR codes to program an associated VCR for recording, through for example, an IR blaster.

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SUMMARY OF THE INVENTION

The present inventors recognize that there is a problem with the previously mentioned one-touch recording feature, when the program selected for recording is already in progress. Specifically, the existing one-touch recording feature will merely record the remaining portion of
20 the program, if the selected program is already in progress. Therefore, the user will then miss a portion of his or her favorite movie or show, etc.

Therefore, the present inventors recognize the desirability of solving these problems, especially in light of the popularity of the channel guide, which gives information about the availability of future programs. Hence,
25 a system and method is presented, and in one exemplary embodiment, comprising the steps of:

5 receiving program data;
receiving selection of a program;
receiving request for recording of the selected program; and
determining whether the selected program is already in progress,
and if the selected program is already in progress, providing a
10 choice to record a later occurrence of the selected program so that
the entire selected program may be recorded.

In another exemplary embodiment, a method is presented,
comprising the steps of:

receiving a user request;
15 performing a search of said program data for a match to said user
entered request;
determining, if a matched program is found, whether said found
program is in progress; and
if said found program is already in progress, offering to record a
20 later occurrence of the found program so that the entire found program
may be recorded.

The apparatus or method can also notify the viewer by on-screen
display or other means of the availability of the program. In those
instances where descriptive text accompanies the program listing,
25 apparatus of the invention performs a search of the text for a particular

5 text string which may relate to the title, the star, the director, or the context of the program, among other search criteria.

BRIEF DESCRIPTION OF THE DRAWING

FIGS. 1a-1c are illustrations of a screen display of a portion of a 10 channel guide, in accordance with one aspect of the invention.

FIG. 2 is an illustration of a screen display showing a search request screen in accordance with another aspect of the invention.

FIG. 2A is an illustration of a screen display offering a user a choice of program recording options in accordance with another aspect of the 15 invention.

FIG. 3 is an illustration of a screen display of a portion of a channel guide showing auxiliary program information.

FIG. 4 is an illustration in block diagram form of apparatus suitable for use with the invention.

20 FIG. 5 is an illustration of a search request list in accordance with the subject invention.

FIG. 6 is an illustration of a screen display useful for entering text search phrases in accordance with the invention.

FIG. 7 is a flowchart useful in understanding the invention.

DETAILED DESCRIPTION OF THE INVENTION

Television systems such as the RCA® DSS® direct broadcast satellite system and Starsight® transmit channel guides for display on the television receivers of subscribers.

FIGS. 1a-1c show Program Guide screen displays produced, for example, by an RCA® DSS® direct broadcast satellite receiver system, manufactured by Thomson Consumer Electronics, Inc. Indianapolis, IN. A user selects a television program from a Program Guide for viewing, by moving a cursor (via operation of remote control up, down, right, and left, direction control keys, not shown) to a block of the program guide screen display which contains the name of the desired program. When a SELECT key on the remote control is pressed, the current x and y position of the cursor is evaluated to derive virtual channel and program time information. In this example of FIG. 1a, a particular television show, EVENING NEWS has been highlighted for selection by use of the cursor keys on a remote control unit (e.g., 450R of FIG. 4). The highlighting is illustrated by the dark box outlining the title in FIGS. 1a-1c. Normally, upon pressing the SELECT key, the relevant programming data is transferred to a programming unit.

However, note the phrase "ENTER ALL OR PART OF A PROGRAM NAME TO SEARCH" which appears at the bottom of Fig. 1a. In this case

5 the word "HOME" has been entered by a user. Upon pressing the MENU key, a search of the channel guide information is performed for the next occurrence of a television program including the word "HOME" in its title. At the completion of the search, the screen display of FIG. 1b is generated. Note that a television program on channel 106 entitled
10 "HOME IMPROVEMENT" is now highlighted. If desired, a further search can be initiated by pressing the MENU key again. The result of that further search is shown in the screen display of FIG. 1c. Note that in FIG. 1c, a television program on channel 305, "HOME AND GARDEN" is highlighted, because that title includes the word "HOME", and thus
15 satisfies the search criteria. The subject apparatus can also perform "substring searching" wherein the keyword (search term) is contained within another word. For example, a substring search on the word HOME would find the movie title "HOMEWARD BOUND". Similarly, the search can be made case sensitive, or case insensitive, as desired.

20 FIG. 2 shows a "GOPHER PROGRAM" screen display 210 useful for entering text to be searched, and for entering instructions to be executed in the event that the search is terminated. The search entered on screen display 210 will perform the logical "AND" function on the search terms "ZULU" (a movie title) and "MICHAEL CAINE" (one of
25 ZULU'S stars). While a logical "AND" function is shown, logical "OR" and "NOT" functions are also envisioned. In fact, a logical "OR" function

5 could simply be performed by entering the search terms as two different searches. That is, if the search term "ZULU" were entered by itself, the movie "ZULU" AND any television program concerning the ZULU tribe would be selected. If the search term "MICHAEL CAINE" were entered as a separate search, the movie "ZULU" and any other movie starring
10 Michael Caine would be selected.

Note from screen display 210, that when the movie "ZULU" is found, it is to be recorded. That is, after entering the search terms and instructions via screen display 210, the user does not have to perform any further function (other than ensuring that the VCR has a tape in it) to
15 secure a recording of the movie "ZULU" whenever it is aired. At the proper time the apparatus of the invention will transmit the record commands to the VCR, automatically, through an IR transmitter 418R, shown in Fig. 4. Alternatively, the user may have checked the box labeled DISPLAY A "PROGRAM LOCATED" MESSAGE, in which case the show
20 will not be recorded, but rather a reminder will be displayed on-screen indicating that the search has successfully terminated upon finding the requested item.

In addition, the user may highlight and select a program from program guide directly, as shown, for example, in Fig. 1b. Once a
25 program such as "home improvement" is selected, the user may press a

5 "record" key, for example, on the remote control450R shown in Fig. 4 to record the program.

In either case, if the desired program is already in progress, then, as shown in FIG. 2A, the apparatus will offer the user via the on-screen display the option of either recording the remaining portion of the program
10 then being broadcast, or searching for the next occurrence, i.e., broadcast, of the program and recording the program in its entirety at such time.

FIG. 3 shows a Program Guide screen 310, including an auxiliary information display 320. The text of auxiliary display 320 includes the
15 search terms "ZULU" and "MICHAEL CAINE" in the program description.

This text will be searched by the GOPHER PROGRAM and the search will come to a successful conclusion. Note that a search of "ZULU" and "STANLEY BAKER" would have been equally successful. It is important to note that not only is the Program Guide text, but also the auxiliary
20 information associated with the television programs, is being searched.

As noted above, the channel guide data used by the controller of the subject apparatus to form the above-described interactive or confirmation sentences may be received from a satellite television communication system. FIG. 4 shows such a satellite television
25 communication system in which, a satellite 400S receives a signal representing audio, video, or data information from an earth-based

5 transmitter 400T. The satellite amplifies and rebroadcasts this signal to a plurality of receivers 400R, located at the residences of consumers, via transponders operating at specified frequencies and having given bandwidths. Such a system includes an uplink transmitting portion (earth to satellite), an earth-orbiting satellite receiving and transmitting unit, and
10 a downlink portion (satellite to earth) including a receiver located at the user's residence.

In such a satellite system, the information necessary to select a given television program is not fixedly-programmed into each receiver but rather is down-loaded from the satellite continually on each transponder.
15 The television program selection information comprises a set of data known as a Master Program Guide (MPG), which relates television program titles, their start and end times, a virtual channel number to be displayed to the user, and information allocating virtual channels to transponder frequencies and to a position in the time-multiplexed data
20 stream transmitted by a particular transponder. In such a system, it is not possible to tune any channel until the first master program guide is received from the satellite, because the receiver (IRD, or Integrated Receiver Decoder) literally does not know where any channel is located, in terms of frequency and position (i.e. data time slot) within the data
25 stream of any transponder.

5 A master program guide is preferably transmitted on all transponders with the television program video and audio data, and is repeated periodically, for example, every 2 seconds. The master program guide, once received, is maintained in a memory unit in the receiver, and updated periodically, for example every 30 minutes. Retention of the
10 master program guide allows instantaneous television program selection because the necessary selection data are always available. If the master program guide were to be discarded after using it to select a television program, then a delay of at least two seconds would be incurred while a new program guide was acquired, before any further television program
15 selections could be performed.

Once the channel transponder carrying a desired television program is tuned, the data packets containing the audio and video information for that program can be selected from the data stream received from the transponder by examining the data packets for the proper SCID (Service
20 Component Identifier) 12 bit code. If the SCID of the currently received data packet matches the SCID of the desired television program as listed in the program guide, then the data packet is routed to the proper data processing sections of the receiver. If the SCID of a particular packet does not match the SCID of the desired television program as listed in the
25 program guide, then that data packet is discarded.

5 A brief description of system hardware, suitable for implementing
the above-described invention, now follows. In FIG. 4, a transmitter
400T processes a data signal from a source 401 (e.g., a television signal
source) and transmits it to a satellite 400S which receives and
rebroadcasts the signal to a receiving antenna 400A which applies the
10 signal to a receiver 400R. Transmitter 400T includes an encoder 410T, a
modulator (i.e., modulator/forward error corrector (FEC)) 420T, and an
uplink unit 430T. Encoder 410T compresses and encodes signals from
source 401 according to a predetermined standard such as MPEG. MPEG
is an international standard developed by the Moving Picture Expert Group
15 of the International Standards Organization for coded representation of
moving pictures and associated audio stored on digital storage medium.
An encoded signal from unit 410T is supplied to modulator/Forward Error
Corrector (FEC) 420T, which encodes the signal with error correction
data, and Quaternary Phase Shift Key (QPSK) modulates the encoded
20 signal onto a carrier.

Uplink unit 430T transmits the compressed and encoded signal to
satellite 400S, which broadcasts the signal to a selected geographic
reception area. The signal from satellite 400S is received by an antenna
dish 400A coupled to an input of a so-called set-top receiver 400R (i.e.,
25 an interface device situated atop a television receiver). Receiver 400R
includes a demodulator (demodulator/Forward Error Correction (FEC)

5 decoder) 410R to demodulate the signal and to decode the error
correction data, an IR receiver 412 for receiving IR remote control
commands, a microprocessor 415R, which operates interactively with
demodulator/FEC unit 410R, and a transport unit 420R to transport the
signal to an appropriate decoder 430R within unit 400R depending on the
10 content of the signal, i.e., audio or video information. An NTSC Encoder
440R encodes the decoded signal to a format suitable for use by signal
processing circuits in a standard NTSC consumer VCR 402 and standard
NTSC consumer television receiver 403. Microprocessor (or
microcontroller, or microcomputer) 415R receives infrared (IR) control
15 signals from remote control unit 450R, and sends control information to
VCR 402 to record a program via an IR link 418R. Microprocessor 415R
also generates the on-screen display signals needed for presenting the
interactive sentence, or confirmation sentence, to the user.
Microprocessor 415R also offers users via the on-screen display the
20 choice of either recording the remaining portion of the program then
being broadcast, or searching for the next occurrence of the program and
recording the program in its entirety at such time, in accordance with the
principles of the present invention. Microprocessor 415R also receives
and interprets cursor key X and Y information in order to control the
25 highlighting of user choices in the on-screen displays.

5 FIG. 5 shows a search request list which may be displayed as a screen display. In this embodiment of the invention, at least three exemplary actions are possible. First, as noted above, a show may be programmed to be recorded at its next airing without further intervention by the user. Second, as noted above, a reminder can be displayed on-
10 screen that the requested program has been found. Third, a report listing various programs meeting the search criteria and airing in the immediate future (for example, the next three hours) can be prepared and displayed.

In the example of FIG. 5, the user has requested that he be reminded anytime an episode of Star Trek appears in the Program Guide.
15 The user has also requested that the movie "The Shining" be recorded the next time it is found in the guide. The user has also requested that he be reminded anytime the word "robot" appears in the guide or in the program descriptions of the guide. These instructions will run until turned off by the user.

20 The remaining search (i.e., movie, drama, now) is a request which indicates that the user wants to know which dramas are being aired in the immediate future (i.e., within the next three hours). The controller will prepare a report listing all dramatic movies on all channels which are being broadcast in the next few hours. After doing so, this entry will be
25 automatically deleted. It is further envisioned that a user may review and edit or delete search terms in order to modify on-going searches.

5 FIG. 6 shows a screen display of a "virtual keyboard" useful for
entering search data instructions, such as: record a program already in
progress; search for the next occurrence of a program in progress and
record it in its entirety at such time; or send a reminder. Four "Search
10 Gophers" called "Watchdogs" are programmable for performing
simultaneous searches of the Program Guide and auxiliary information
data streams. By using the CURSOR and SELECT keys, a user can
"press" one of the watchdog buttons on the left of the screen to select it.
He may then use the alphabet keys to enter his search request. (While
not explicitly shown, alphanumeric keys are also envisioned). When the
15 user is satisfied with the text of his search request, he may press the
Save key to save the search terms for this watchdog search process. If
he makes an error, he may delete the error with the CLEAR key.

The Gopher program is entered at step 700 of FIG. 7. At step
705, the search terms are retrieved. At step 710, the Program Guide data
20 is acquired. At step 715 a comparison is made to see if a match exists. If
not the program is exited at step 720. If a match does exist, then the
user-entered instructions are retrieved. A check is made at step 725 to
determine if a record instruction has been entered. If a record instruction
has been entered, the routine advances to step 730 to determine whether
25 the program to be recorded is in progress. If a record instruction has not
been entered, then the routine advances to step 735 at which a reminder

5 message is generated for display on-screen or by other means, e.g., e-mail, either immediately or at an appropriate later time as a "last minute reminder" before the desired show is broadcast, or both. The routine is then exited at step 740.

If at step 730, a determination is made that the program to be
10 recorded is in progress, then the routine advances to step 745 where the user is offered the choice via the on-screen display or by other means of either recording the remaining portion of the program being broadcast or scheduling the tuning and recording of the program at a later occurrence so that the program can be recorded in its entirety. In one exemplary
15 embodiment, the later occurrence of the desired program is the next immediate occurrence of the program.

The user may employ, for example, remote control unit 450R to make a selection, wherein such selection can be made by means of pressing a single control button thereon. The routine then advances to
20 step 750 where the record commands are transmitted to the VCR to record the program and the routine is then exited at step 740.

If, however, at step 730 it is determined that the program to be recorded is not in progress, then the routine advances to step 750 where the record commands are transmitted to the VCR to record the program
25 and the routine is then exited at step 740.

5 In addition, as shown in step 760 and described previously, a user
may also select a program from the program guide directly for recording
by using, for example, selection and record keys on a user remote control
450R. It will then be determined whether this program is already in
progress at step 730, and be processed through the steps as described
10 above.

Although the invention was described with reference to a satellite television system, it is equally applicable to ground based television broadcast systems, both digital and analog.

Numerous modifications to and alternative embodiments of the
15 present invention will be apparent to those skilled to the art in view of the
foregoing description. Accordingly, this description is to be construed as
illustrative only and is for the purpose of teaching those skilled in the art
the best mode of carrying out the invention. Details of the structure may
be varied substantially without departing from the spirit of the invention
20 and the exclusive use of all modifications which come within the scope of
the appended claims is reserved.